CLAIMS

What is claimed is:

1. An apparatus for controlling access to a shared channel, the shared channel being accessed by a plurality of access point (AP) stations in order to communicate over a first network with a central node (CN) serving the AP stations (APs), the CN corresponding to a point of entry into a wired network, wherein the AP and the CN comprise, respectively, AP logic and CN logic that enable access instants in communicating between the APs and CNs to be automatically re-aligned in response to changes in bandwidth utilization in the network without requiring that any AP inform any other AP of the changes in the network.

2. The apparatus of claim 1, wherein the first network is a wireless network.

3. The apparatus of claim 2, wherein the apparatus is implemented in a backhaul network configuration.

4. The apparatus of claim 1, wherein the AP logic includes first logic for determining whether the channel has been idle for a first period of time t1, wherein when the first logic determines that the channel has been idle for the first period of time t1, the first logic causes the apparatus to enter a contention state during which a first one of said AP stations determines whether or not said first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, wherein if the first logic determines that the first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, the first logic causes said apparatus to enter an observation state.

5. The apparatus of claim 4, wherein the AP logic further includes second logic, wherein during said observation state, said second logic determines whether or not an observation period t2 has expired and whether or not the channel is idle, wherein if said second logic determines that the observation period t2 has expired and that the channel is idle, the second logic causes said apparatus to enter a transmit state during which said apparatus causes said first one of said AP stations to transmit a packet over the channel.

6. The apparatus of claim 5, wherein the AP logic further includes third logic, wherein said third logic is capable of varying the observation period t2 to enable one or more of said AP stations to attempt to access the channel at varying frequencies.

7. The apparatus of claim 6, wherein at least two of the AP stations are real-time AP stations and wherein at least one of the AP stations is a non-real-time AP station, said first one of said AP stations being a non-real-time AP station, the real-time AP stations having priority channel access over the non-real time AP station, the AP logic further including fourth logic, the fourth logic determining whether the channel has been idle for a third period of time t3, wherein when the fourth logic determines that the channel has been idle for the third period of time t3, the fourth logic causes the apparatus to enter said contention state during which a first one of said real-time AP stations determines whether or not said first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, wherein if the fourth logic determines that the first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, the fourth logic causes said apparatus to enter said observation state, and wherein t3 is less than t1.

8. The apparatus of claim 6, wherein said first, second and third logic are comprised in a state machine, the state machine being hardware having one or more timers for setting the first time period t1 and the observation period t2.

9. The apparatus of claim 6, wherein said first, second and third logic are comprised as a combination of hardware and software, the hardware being a computer, the computer being programmed with the software to enable the computer to perform functions associated with the first, second and third logic.

10. An apparatus for controlling access to a shared channel, the shared channel being accessed by a plurality of access point (AP) stations in order to communicate with a central node (CN) serving the AP stations, the CN corresponding to a point of entry into a wired network, the apparatus comprising:

first logic, the first logic determining whether the channel has been idle for a first period of time t1, wherein when the first logic determines that the channel has been idle for the first period of time t1, the first logic causes the apparatus to enter a contention state during which a first one of said AP stations determines whether or not said first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, wherein if the first logic determines that the first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, the first logic causes said apparatus to enter an observation state;

second logic, wherein during said observation state, said second logic determines whether or not an observation period t2 has expired and whether or not the channel is idle, wherein if said second logic determines that the observation period t2 has expired and that the channel is idle, the second logic causes said apparatus to enter a transmit state during which said apparatus causes said first one of said AP stations to transmit a packet over the channel; and

third logic, wherein said third logic is capable of varying the observation period t2 to enable one or more of said AP stations to attempt to access the channel at varying frequencies.

11. The apparatus of claim 10, wherein said first, second and third logic are comprised in a state machine, the state machine being hardware having one or more timers for setting the first time period t1 and the observation period t2.

12. The apparatus of claim 10, wherein said first, second and third logic are comprised as a combination of hardware and software, the hardware being a computer, the computer being programmed with the software to enable the computer to perform functions associated with the first, second and third logic.

13. The apparatus of claim 10, wherein at least two of the AP stations are real-time AP stations and wherein at least one of the AP stations is a non-real-time AP station, said first one of said AP stations being a non-real-time AP station, the apparatus further comprising:

fourth logic, the fourth logic determining whether the channel has been idle for a third period of time t3, wherein when the fourth logic determines that the channel has been idle for the third period of time t3, the fourth logic causes the apparatus to enter said contention state during which a first one of said real-time AP stations determines whether or not said first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, wherein if the fourth logic determines that the first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, the fourth logic causes said apparatus to enter said observation state, and wherein t3 is less than t1, and wherein the real-time AP stations are given channel access priority over non-real-time AP stations.

14. The apparatus of claim 10, wherein said apparatus is utilized in a backhaul network configuration, and wherein said third logic periodically shortens the observation period t2 to cause at least one of said AP stations to access the channel at increased frequency.

15. The apparatus of claim 10, wherein all of the AP stations are non-real-time AP stations.

16. The apparatus of claim 10, wherein said apparatus is utilized in a backhaul network configuration, and wherein said third logic periodically shortens the observation period t2 to cause at least one of said AP stations to access the channel at increased frequency.

17. The apparatus of claim 10, wherein all of the AP stations are non-real-time AP stations.

18. An apparatus for controlling access to a shared channel, the shared channel being accessed by a plurality of access point (AP) stations in order to communicate with a central node (CN) serving the AP stations, the apparatus comprising:

first means for determining whether the channel has been idle for a first period of time t1, wherein when the first means determines that the channel has been idle for the first period of time t1, the first means causes the apparatus to enter a contention state during which a first one of said AP stations determines whether or not said first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, wherein if the first means determines that the first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, the first means causes said apparatus to enter an observation state;

second means, wherein during said observation state, said second means determines whether or not an observation period t2 has expired and whether or not the channel is idle, wherein if said second means determines that the observation period t2 has expired and that the channel is idle, the second means causes said apparatus to enter a transmit state during which said apparatus causes said first one of said AP stations to transmit a packet over the channel; and

third means, wherein said third means is capable of varying the observation period t2 to enable one or more of said AP stations to attempt to access the channel at varying frequencies.

19. The apparatus of claim 18, wherein said first, second and third means are comprised in a state machine having one or more timers for setting the first time period t1 and the observation period t2.

20. The apparatus of claim 18, wherein said first, second and third means are comprised as a combination of hardware and software, the hardware being a computer, the computer being programmed with the software to enable the computer to perform functions associated with the first, second and third means.

21. The apparatus of claim 18, wherein at least two of the AP stations are real-time AP stations and wherein at least one of the AP stations is a non-real-time AP station, said first one of said AP stations being a non-real-time AP station, the apparatus further comprising:

fourth means, the fourth means determining whether the channel has been idle for a third period of time t3, wherein when the fourth means determines that the channel has been idle for the third period of time t3, the fourth means causes the apparatus to enter said contention state during which a first one of said real-time AP stations determines whether or not said first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, wherein if the fourth means determines that the first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, the fourth means causes said apparatus to enter said observation state, and wherein t3 is less than t1.

22. The apparatus of claim 18, wherein said apparatus is utilized in a backhaul network configuration, and wherein said third means periodically shortens the observation period t2 to cause at least one of said AP stations to attempt to access the channel at increased frequency.

23. The apparatus of claim 18, wherein all of the AP stations are non-real-time AP stations.

24. A method for controlling access to a shared channel, the shared channel being accessed by a plurality of access point (AP) stations (APs) in order to communicate over a network with a central node (CN) serving the AP stations, the method comprising the steps of:

configuring each AP and the CN with logic that enable access instants in communicating between the APs and CNs to be automatically re-aligned in response to changes in bandwidth utilization in the network without requiring that any AP inform any other AP of the changes in the network.

25. The method of claim 24, wherein the APs communicate with the CN wirelessly.

26. The method of claim 24, wherein the method is implemented in a backhaul network configuration.

27. A method for controlling access to a shared channel, the shared channel being accessed by a plurality of access point (AP) stations in order to communicate with a central node (CN) serving the AP stations, the CN corresponding to a point of entry into a wired network, the method comprising the steps of:

determining whether the channel has been idle for a first period of time t1, wherein when a determination is made that the channel has been idle for the first period of time t1, a first one of said AP stations determines whether or not said first one of said AP stations has been waiting longer than any other of said AP stations to access the channel;

wherein if a determination is made that the first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, determining whether or not an observation period t2 has expired and whether or not the channel is idle, wherein if a determination is made that the observation period t2 has expired and that the channel is idle, causing said first one of said AP stations to transmit a packet over the channel; and

periodically varying the observation period t2 to cause one or more of said AP stations to attempt to access the channel at varying frequencies.

28. The method of claim 27, wherein at least two of the AP stations are real-time AP stations and wherein at least one of the AP stations is a non-real-time AP station, said first one of said AP stations being a non-real-time AP station, the method further comprising the steps of:

determining whether the channel has been idle for a third period of time t3, t3 being less than t1, wherein when a determination is made that the channel has been idle for the third period of time t3, a first one of said real-time AP stations determines whether or not said first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, wherein if a determination is made that the first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, the determination is made as to whether or not the observation period t2 has expired.

29. The method of claim 27, wherein all of the AP stations are non-real-time AP stations.

30. A computer program for controlling access to a shared channel, the shared channel being accessed by a plurality of access point (AP) stations in order to communicate with a central node (CN) serving the AP stations, the computer program being embodied on a computer-readable medium, the program comprising:

a first code segment, the first code segment determining whether the channel has been idle for a first period of time t1;

a second code segment, wherein when a determination is made that the channel has been idle for the first period of time t1, the second code segment determines whether a first one of said AP stations has been waiting longer than any other of said AP stations to access the channel;

a third code segment, wherein if a determination is made that the first one of said AP stations has been waiting longer than any other of said AP stations to access the channel, the third code segment determines whether or not an observation period t2 has expired and whether or not the channel is idle;

a fourth code segment, wherein if a determination is made that the observation period t2 has expired and that the channel is idle, the fourth code segment causes said first one of said AP stations to transmit a packet over the channel; and

a fifth code segment, the fifth code segment periodically varying the observation period t2 to cause one or more of said AP stations to attempt to access the channel at varying frequencies.

31. The computer program of claim 30, wherein at least two of the AP stations are real-time AP stations and wherein at least one of the AP stations is a non-real-time AP station, said first one of said AP stations being a non-real-time AP station, the computer program further comprising:

a sixth code segment, the sixth code segment determining whether the channel has been idle for a third period of time t3, t3 being less than t1;

a seventh code segment, wherein when a determination is made that the channel has been idle for the third period of time t3, the seventh code segment determines whether or not a first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, wherein if a determination is made that the first one of said real-time AP stations has been waiting longer than any other real-time AP station to access the channel, the determination is made by the third code segment as to whether or not the observation period t2 has expired.

32. The computer program of claim 30, wherein all of the AP stations are non-real-time AP stations.